ASCENDING VS DESCENDING FOR EOS-PM

- PRESENT PLAN IS FOR EOS-AM IN A DESCENDING ORBIT THAT CROSSES THE EQUATOR AT 10:30 AM AND EOS-PM IN AN ASCENDING ORBIT THAT CROSSES THE EQUATOR AT 1:30 PM
- BOTH ORBITS GIVE GOOD COVERAGE OF THE NORTHERN HEMISPHERE OCEANS
  - FOR THE AM MISSION, SCENE SUN-TIME GOES FROM ~NOON TO 10:30 AM GOING FROM THE NORTH TO THE EQUATOR
  - FOR THE PM MISSION, SCENE SUN-TIME GOES FROM 1:30 PM TO ~NOON GOING FROM EQUATOR NORTHWARD
  - FIGURE 1 SHOWS THIS RELATIONSHIP
- NEITHER THE AM DESCENDING NOR THE PM ASCENDING ORBITS GIVE GOOD SOUTHERN HEMISPHERE OCEAN COVERAGE
  - FOR THE AM MISSION, SCENE SUN-TIME GOES FROM 10:30 AM TO ~9 AM GOING FROM THE EQUATOR SOUTHWARD
  - FOR THE PM MISSION, SCENE SUN-TIME GOES FROM ~3:00 PM TO 1:30 PM GOING FROM THE SOUTH TOWARDS THE EQUATOR
  - FIGURE 2 SHOWS THIS RELATIONSHIP
- SUGGEST THAT BOTH EOS-AM AND EOS-PM BE DESCENDING
  - AM HAS SAME GOOD NORTHERN OCEAN COVERAGE
  - PM HAS GOOD SOUTHERN OCEAN COVERAGE -- SCENE SUN-TIME GOES FROM 1:30 PM TO ~NOON GOING FROM THE EQUATOR SOUTHWARD
  - FIGURES 3 AND 4 SHOWS THIS RELATIONSHIP

GLINT AND OTHER CONSIDERATIONS

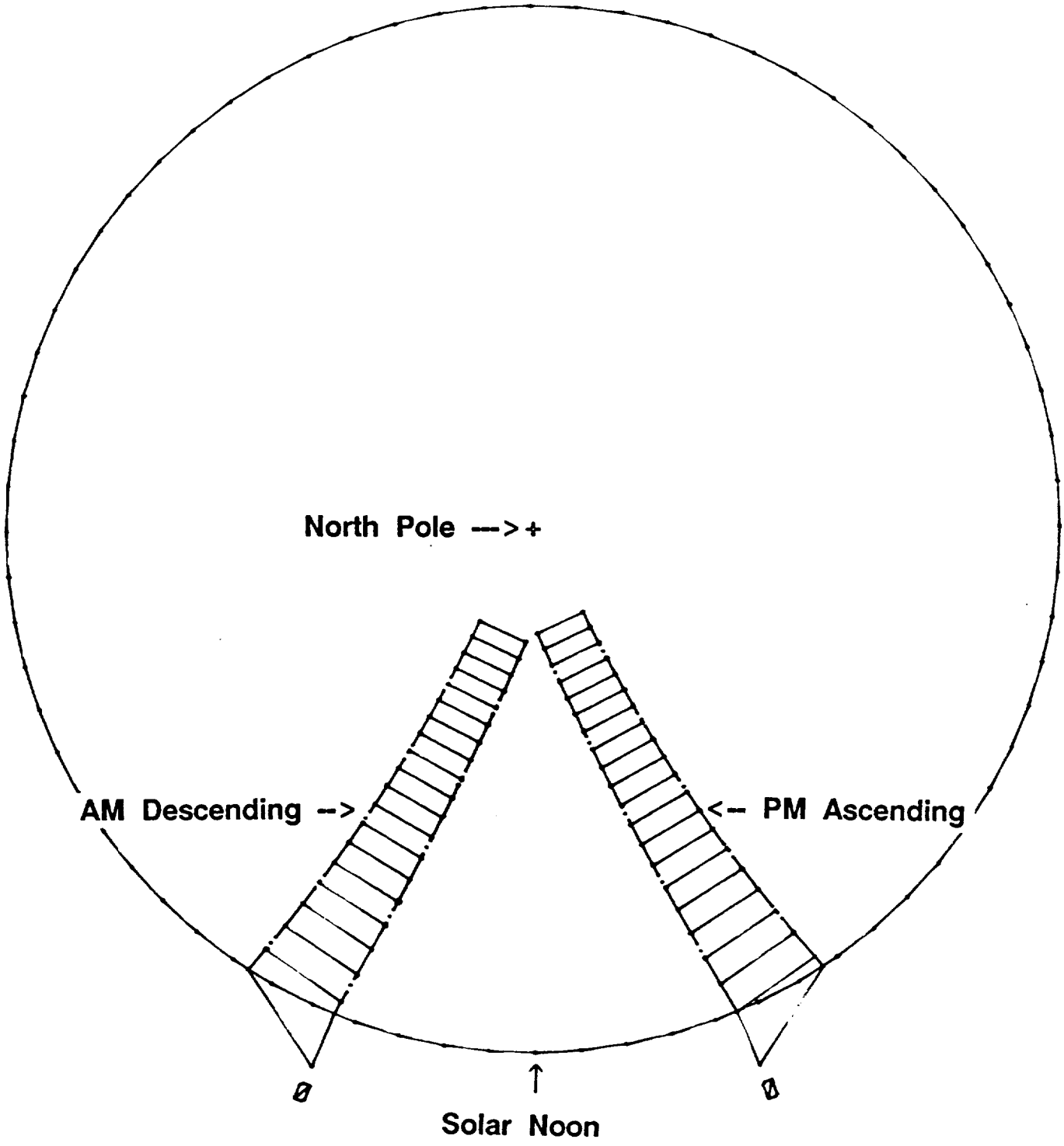
- EACH MODIS ACHIEVES GLOBAL COVERAGE IN TWO DAYS WITH A SCAN ANGLE THAT GOES FROM 55 DEG. ON ANTI-SUN SIDE OF ORBIT TO 25 DEG. ON THE SUNNY SIDE (SEE FIG. 5)
  - AM BETTER IN NORTHERN HEMISPHERE
  - PM BETTER IN SOUTHERN HEMISPHERE
  - BOTH GOOD IN THE TROPICS

- USING BOTH MODIS INSTRUMENTS, GET GLOBAL COVERAGE IN ONE DAY WITH A SCAN ANGLE THAT GOES FROM 55 DEG. ON ANTI-SUN SIDE OF ORBIT TO 13 DEGREES ON SUNNY SIDE (SEE FIG. 6)
  - GOOD FOR TROPICS
  - CANNOT GET ONE-DAY GLOBAL COVERAGE WITH PRESENT ASCENDING/DESCENDING ORBITS AND ONLY 13 DEGREES ON SUNNY SIDE (SEE FIG. 7)

- ALLOWS SAME-DAY VIEWING BY PM OF ANY SCENE VIEWED BY AM
  - GIVES TWO DIFFERENT SOLAR ILLUMINATIONS OF THE SCENE

DISADVANTAGES OF DESCENDING PM

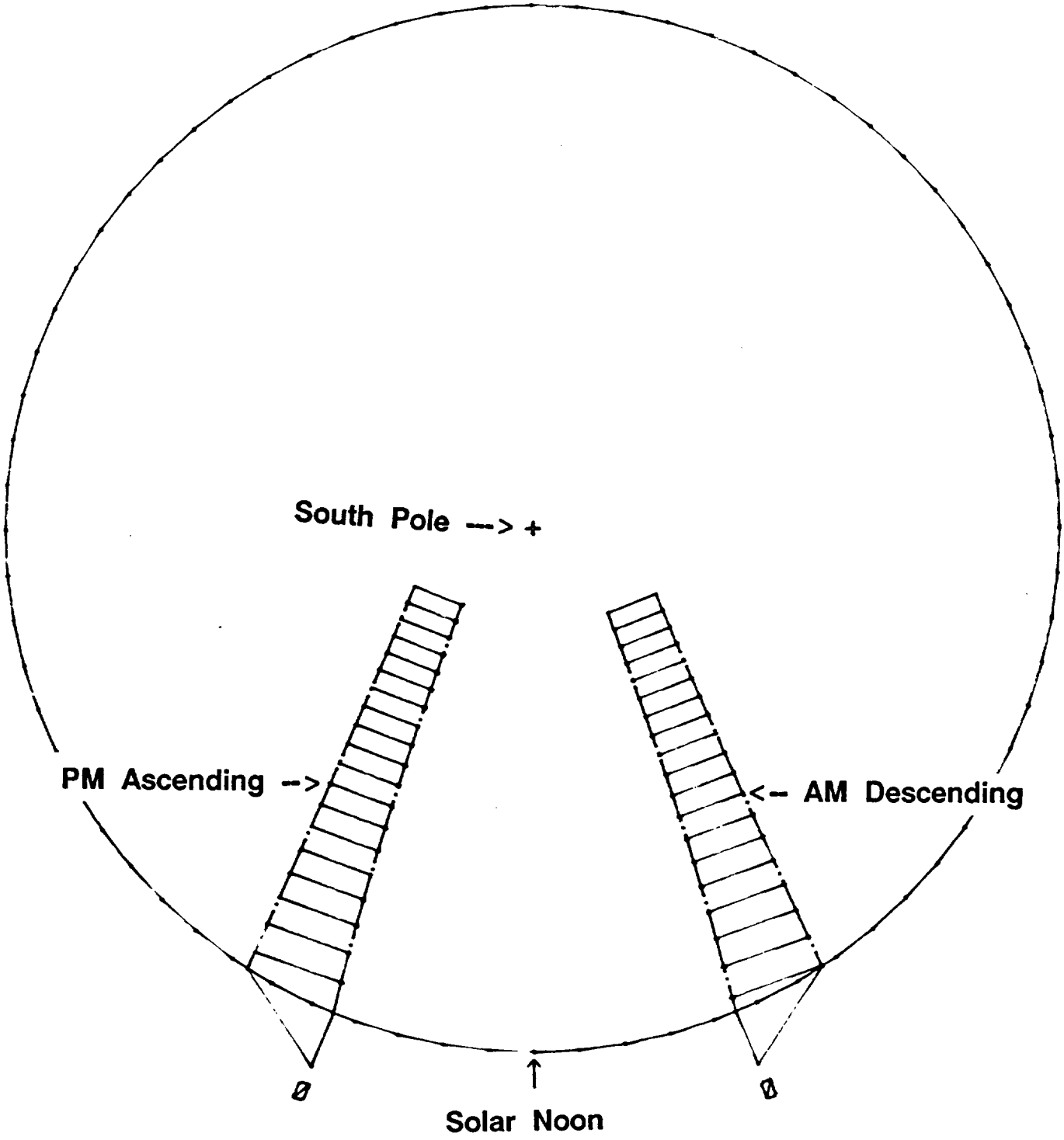
- EOS-PM WOULD FLY "BACKWARDS" SO THAT MODIS WOULD HAVE SAME VIEWS TO EARTH, SPACE AND SUN
  - LINE-TO-LINE RELATIONSHIP REVERSED FROM AM TO PM
  - MAY BE SMALL EARTH ROTATION EFFECTS IN MODIS FOCAL PLANE
- DRAG-MAKEUP PROPULSION WOULD REQUIRE EITHER :
  - 180 DEGREE MANEUVER OR
  - THE PLACEMENT OF A JET ON SAME END AS MODIS
- WOULD NEED TO CHANGE PHASE-B STUDY



MODIS AM & PM 'GLINT-FREE'

Figure 1

NORTHERN HEMISHPERE
ORBIT-SUN RELATIONS
AM DECENDING, PM ASCENDING

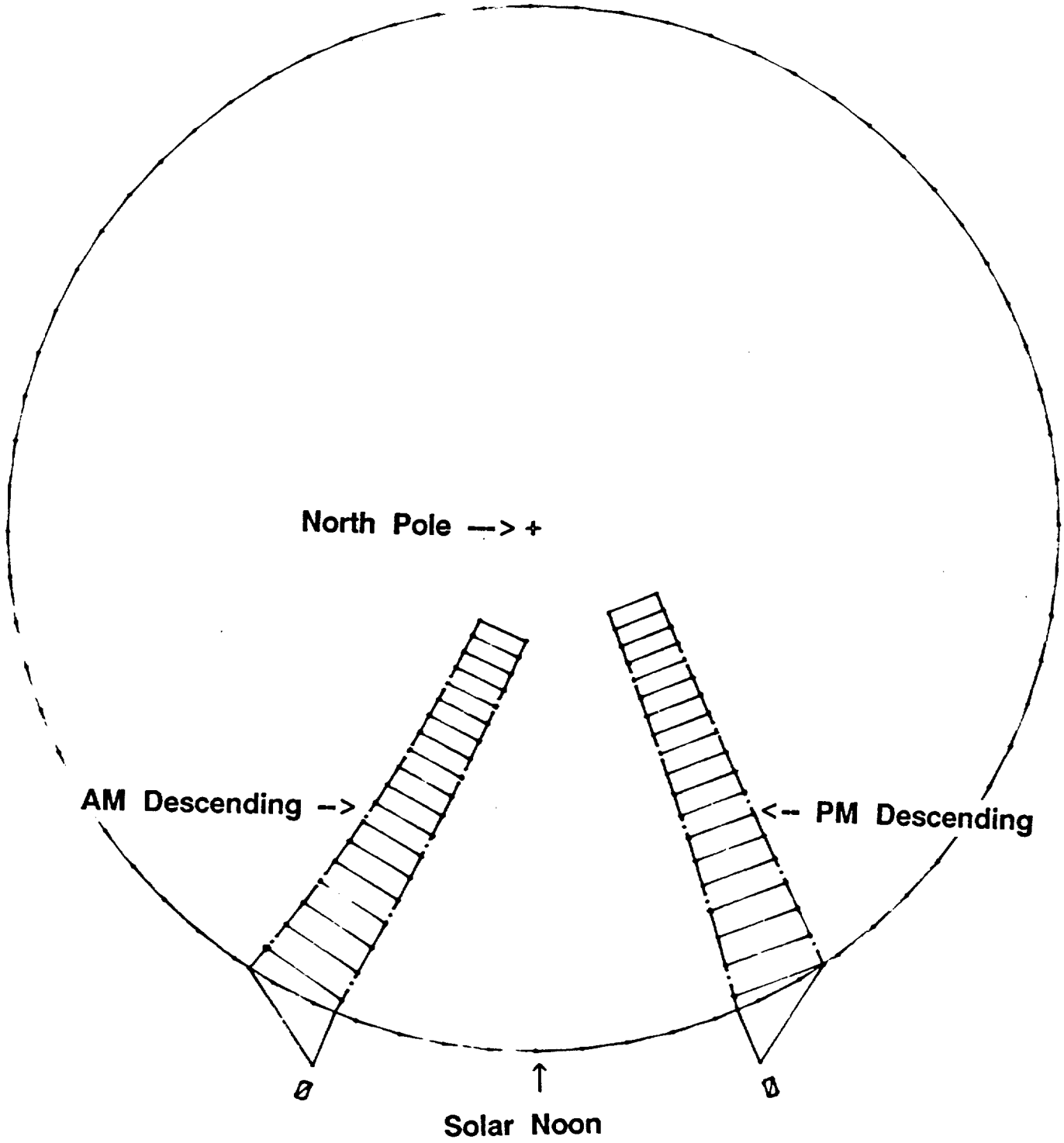


MODIS AM & PM 'GLINT-FREE'

SOUTHERN HEMISHPERE
ORBIT-SUN RELATIONS
AM DESCENDING, PM ASCENDING

Figure 2

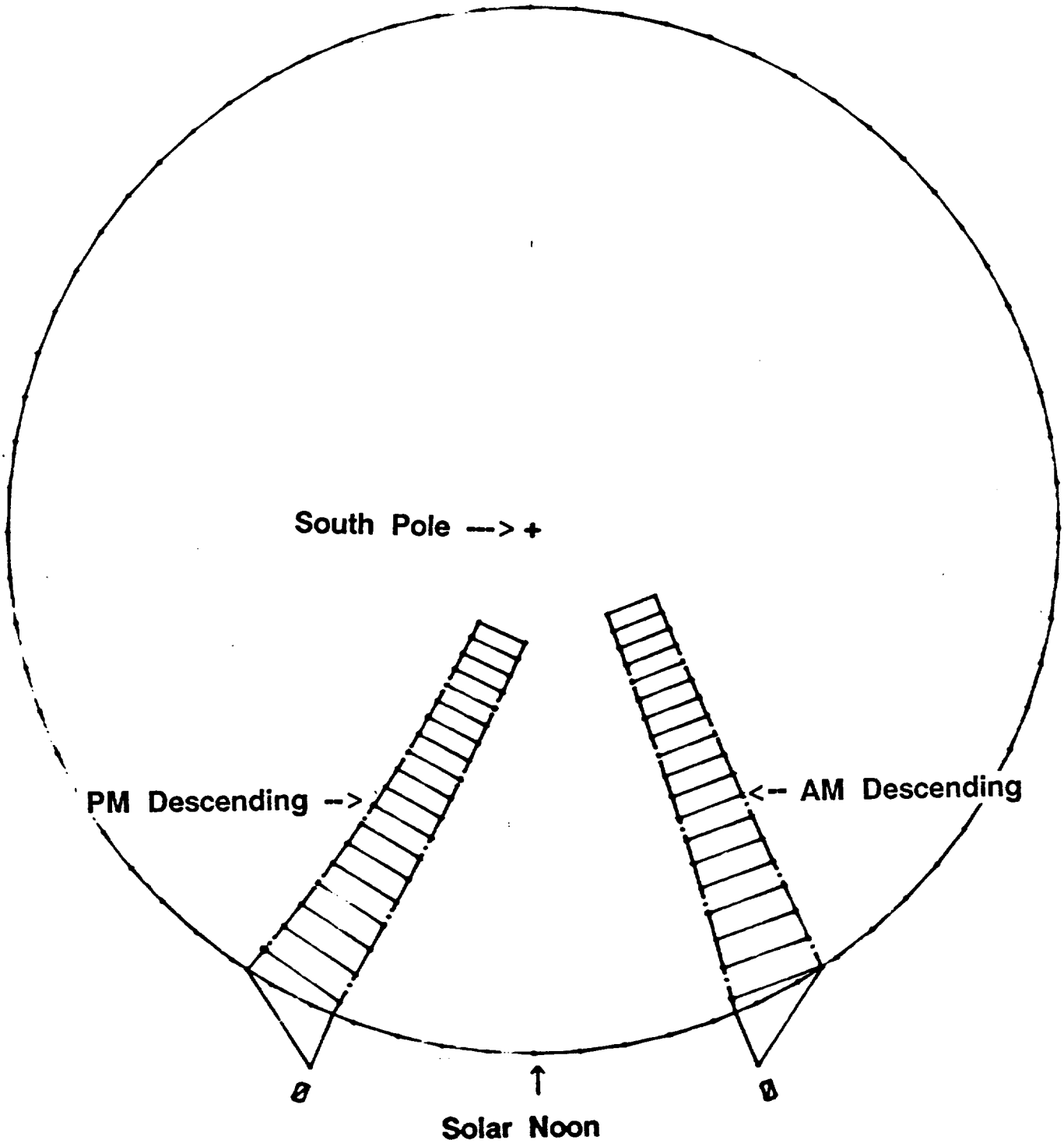
HEWLETT PACKARD



MODIS AM & PM 'GLINT-FREE'

Figure 3

BOTH HEMISHPERES
ORBIT-SUN RELATIONS
AM DECENDING. PM DECENDING



MODIS AM & PM 'GLINT-FREE'

Figure 4

BOTH HEMISHPERES
ORBIT-SUN RELATIONS
AM DECENDING, PM DECENDING

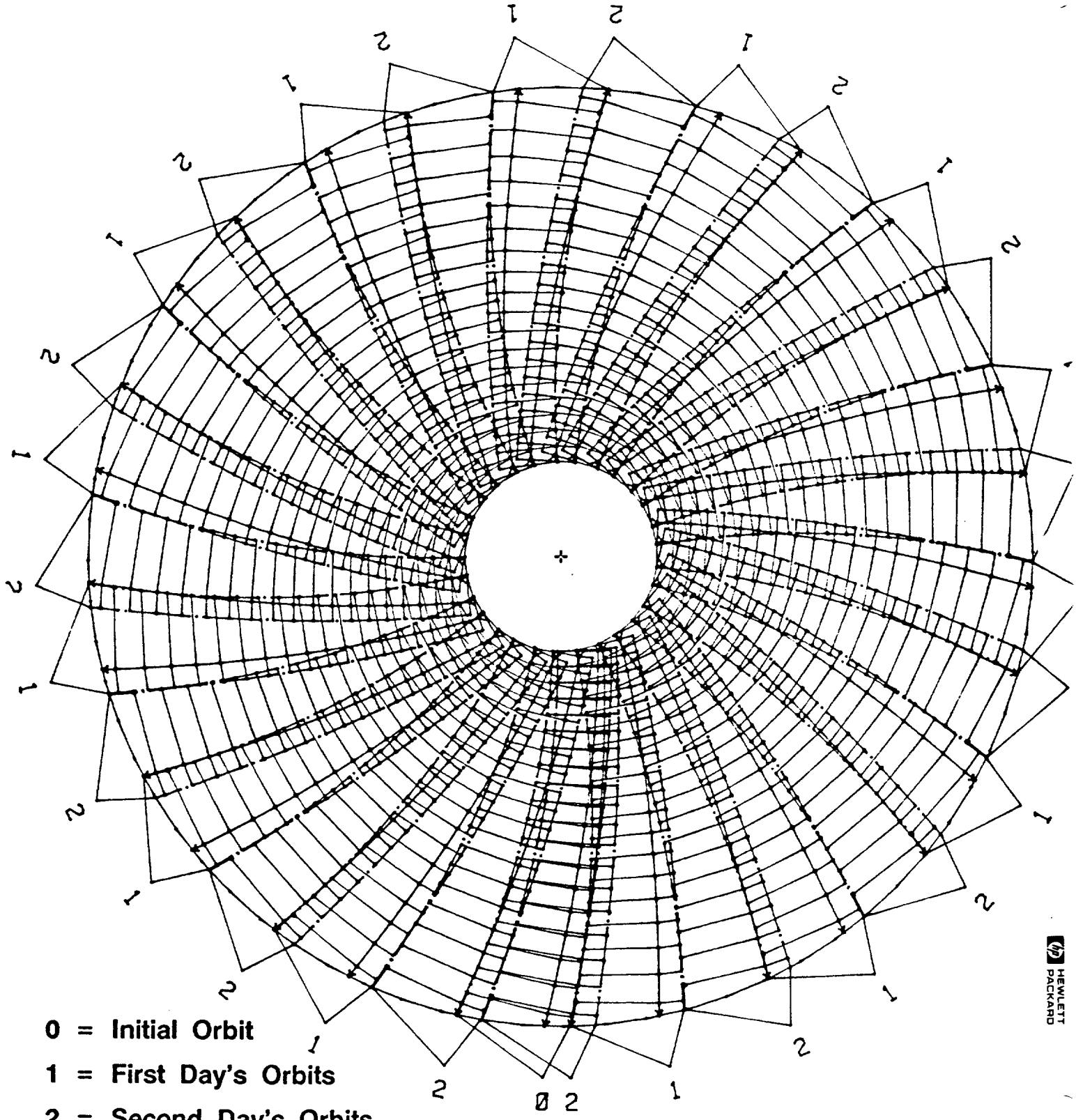
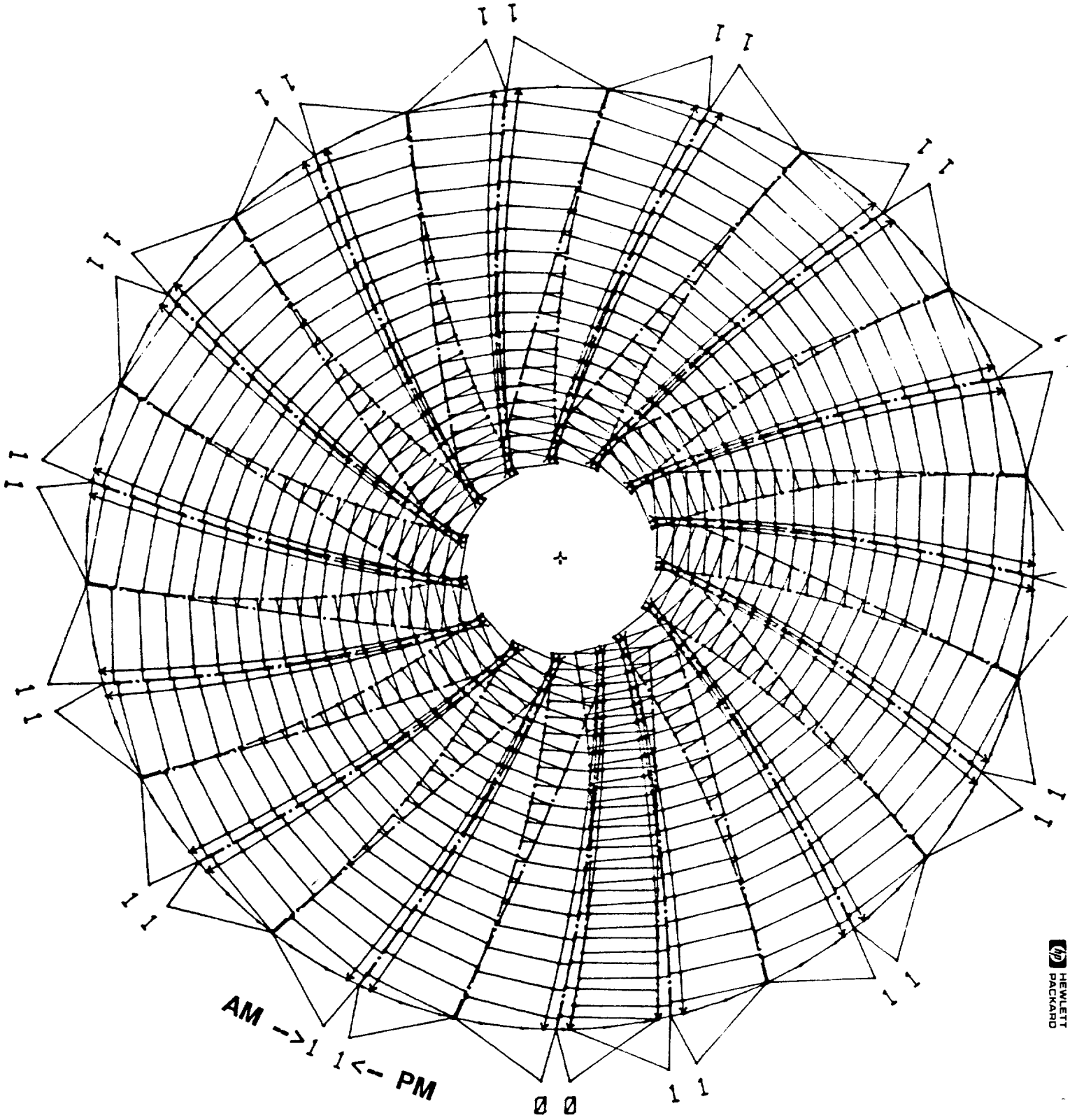

0 = Initial Orbit
1 = First Day's Orbits
2 = Second Day's Orbits
MODIS AM +55 TO -25 SCAN
2-DAY GLOBAL COVERAGE
MEDIUM GLINT
HEWLETT PACKARD

Figure 5

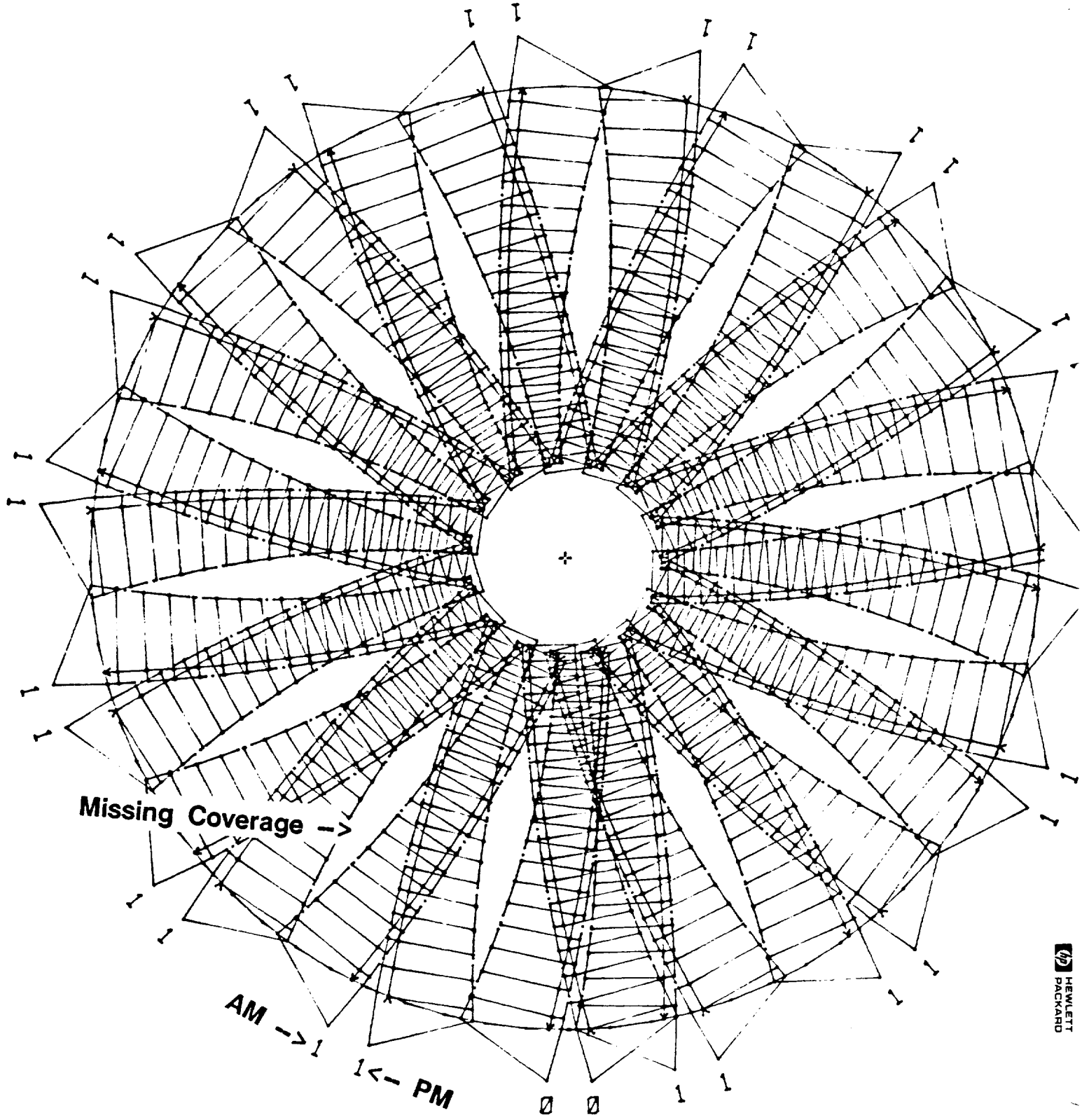


MODIS AM & PM +55 TO -13 SCAN

1-DAY GLOBAL COVERAGE
LOW GLINT
AM & PM DESCENDING

Figure 6

HEWLETT PACKARD



MODIS AM & PM +55 TO -13 SCAN

1-DAY COVERAGE
LOW GLINT
AM DESCENDING, PM ASCENDING

Figure 7